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MODIFICATION TO THE AIR QUALITY ANALYSIS OF THE
DRAFT SUPPLEMENTAL
ENVIRONMENTAL IMPACT REPORT

1145 MARKET STREET
OFFICE BUILDING

81.549E

Publication Date: June 20, 1986

Written Public Comment Period: June 20 to July 11, 1986

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1145 Market Street
office building :
1986.

I INTRODUCTION

This modification of the air quality analysis in the Draft Supplemental Environmental Impact Report for the 1145 Market Street Office Building (81.549E) has been prepared to provide additional information about the air quality effects of the proposed project.

An EIR on the project was published on May 20, 1983 and certified October 20, 1983. A Draft Supplemental EIR (SEIR), which modified and supplemented the original Final EIR analyses of the cumulative effects of the proposed project on transportation, air quality, energy and housing, was published on August 9, 1985. The public comment period on the Draft SEIR was from August 9 to September 12, 1985.

As part of the Office of Environmental Review's ongoing communication with the Bay Area Air Quality Management District (BAAQMD), on April 18, 1986, OER wrote to BAAQMD regarding the problem of unquantified future carbon monoxide (CO) emission reductions from the Vehicle Inspection and Maintenance (I/M) program and whether it would be appropriate to use the latest California Air Resources Board (ARB) emission factors. On May 5, 1986, the BAAQMD responded that as part of its ongoing program of examining changing air quality conditions in the Region, it had modified the ARB emission factors to reflect emission reductions expected from the I/M program and that the City was encouraged to use these values.

Based on the above, OER directed its consultants to begin using these new emission factors in future carbon monoxide (CO) analyses, including the response to a comment on this Draft SEIR which requested additional CO modeling. Inclusion of the new factors accounts for CO reductions previously estimated in the Draft SEIR at about 18% but not taken into account in the CO model (Draft SEIR, p. 75). Since calculation of this reduction is now possible, OER does not believe that it would be appropriate to withhold this

calculation and continue to identify the unquantified CO reduction at about 18%. The CO model is the same model used in the Draft SEIR, only the emission factor inputs have been changed to reflect the latest scientific information supplied to the City by BAAQMD.

This modification of the air quality analysis in the Draft SEIR incorporates these updated emission factors in the calculation of vehicle-related carbon monoxide impacts. As a result of this recalculation of carbon monoxide impacts, the Office of Environmental Review no longer believes the project or cumulative development, would result in significant carbon monoxide impacts under CEQA.

Chapter II, Environmental Impacts - Air Quality, which follows, replaces Section V.C, Impacts - Air Quality (pp. 71-78) of the Draft SEIR. These changes to pp. 71-78 are largely identical to those presented in the Draft Summary of Comments and Responses on the SEIR which was published June 5, 1985.

Other changes to the Draft SEIR to make other chapters consistent with the Impacts chapter should also be made, as follows.

In Chapter II, Summary the last sentence of the first paragraph on page 8 is deleted.

In Chapter VII. Significant Effects, the first paragraph on page 101 is replaced with the following:

Add a new section "B. Air Quality" as a new paragraph as follows:

"The project would contribute to possible violations of total suspended particulate standards."

II ENVIRONMENTAL IMPACTS — AIR QUALITY

Projected daily emissions of pollutants from project-generated traffic, and from cumulative development traffic (based on the March 22, 1985 list of Cumulative Office Development in Downtown San Francisco), are shown in Table 1, page 4. Table 1 also shows projected daily emissions in 1990 and 2000 for C-3 District development projected by the Downtown Plan EIR (EE81.3, certified October 18, 1984), and total emissions projected for the entire Bay Area by the 1982 Bay Area Air Quality Plan. The project would contribute about 0.7% to the total air pollutant emissions generated by cumulative list projects and two percent to the total emissions generated by downtown development in 1990, as projected by the Downtown Plan EIR.

Alternative 1 to the Downtown Plan (covered in the Downtown Plan EIR) would generate about 38% more emissions in 2000 (from development between 1990 and 2000) than would the Downtown Plan. Alternative 4 would generate about seven percent less emissions than would the Downtown Plan. Emissions generated by Alternatives 2, 3 and 5 would fall within this range. The types of air quality impacts under these alternatives would be the same as those under the Downtown Plan; their magnitude would vary in proportion to the differences in their emissions.¹

Nitrogen oxides (NO_x) and hydrocarbons (HC) are both chemical precursors of ozone. Motor vehicles emit more NO_x than HC, and the emissions from building natural gas combustion would consist primarily of NO_x. As demonstrated by the LIRAQ (Livermore Regional Air Quality model) regional ozone computer simulations performed for the 1982 Bay Area Air Quality Plan, an increase in the future NO_x emissions compared to HC emissions would lead to a decrease in ozone compared to present levels. This model has also shown that Bay Area ozone concentrations are expected to be within the federal standard in 1987, and thereafter. As the future NO_x emissions from cumulative

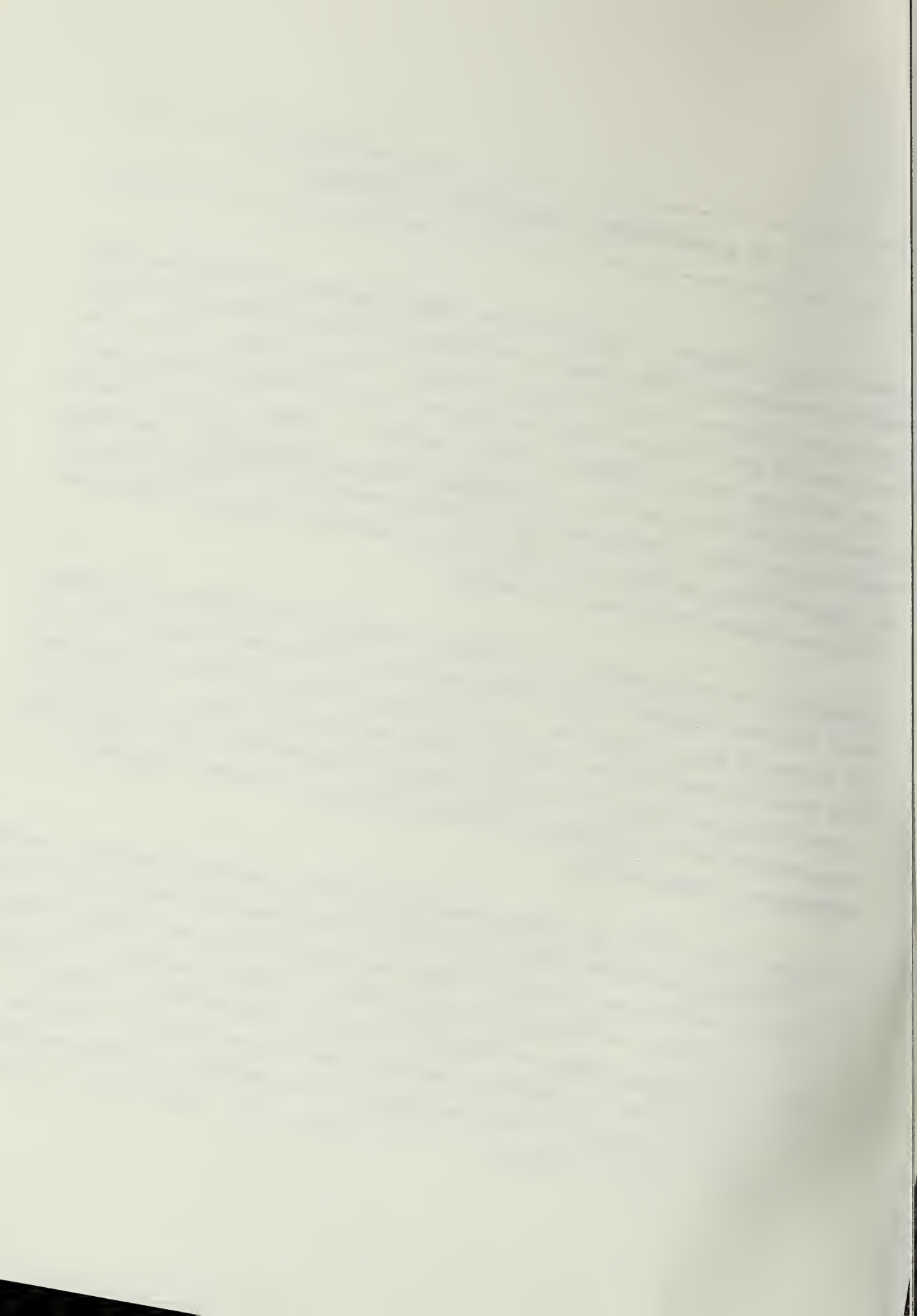


TABLE 1
PROJECTED DAILY POLLUTANT EMISSIONS

Pollutant	Project 1990 ²	Cumulative List 1990 ³	Emissions (tons per day) ¹		Bay Area ⁵	
			1990	2000	1990	2000
Hydrocarbons	0.01	1.5	0.6	0.6	428	428
Nitrogen Oxides	0.01	1.9	0.8	0.8	558	610
Carbon Monoxide	0.07	18.3	6.8	6.6	1,952	1,883
Particulates	0.01	2.9	1.1	1.3	562	649
Sulfur Oxides	0.001	0.22	0.1	0.1	194	233

¹Project, Cumulative List, and Downtown Plan emissions calculated using BAAQMD, EMFAC6C vehicular emission factors which do not take into account the Inspection and Maintenance program. Emissions of HC, NOx, and CO include an assumed six minutes of idling time per vehicle trip. Emissions of TSP include dust disturbed from roadway surfaces.

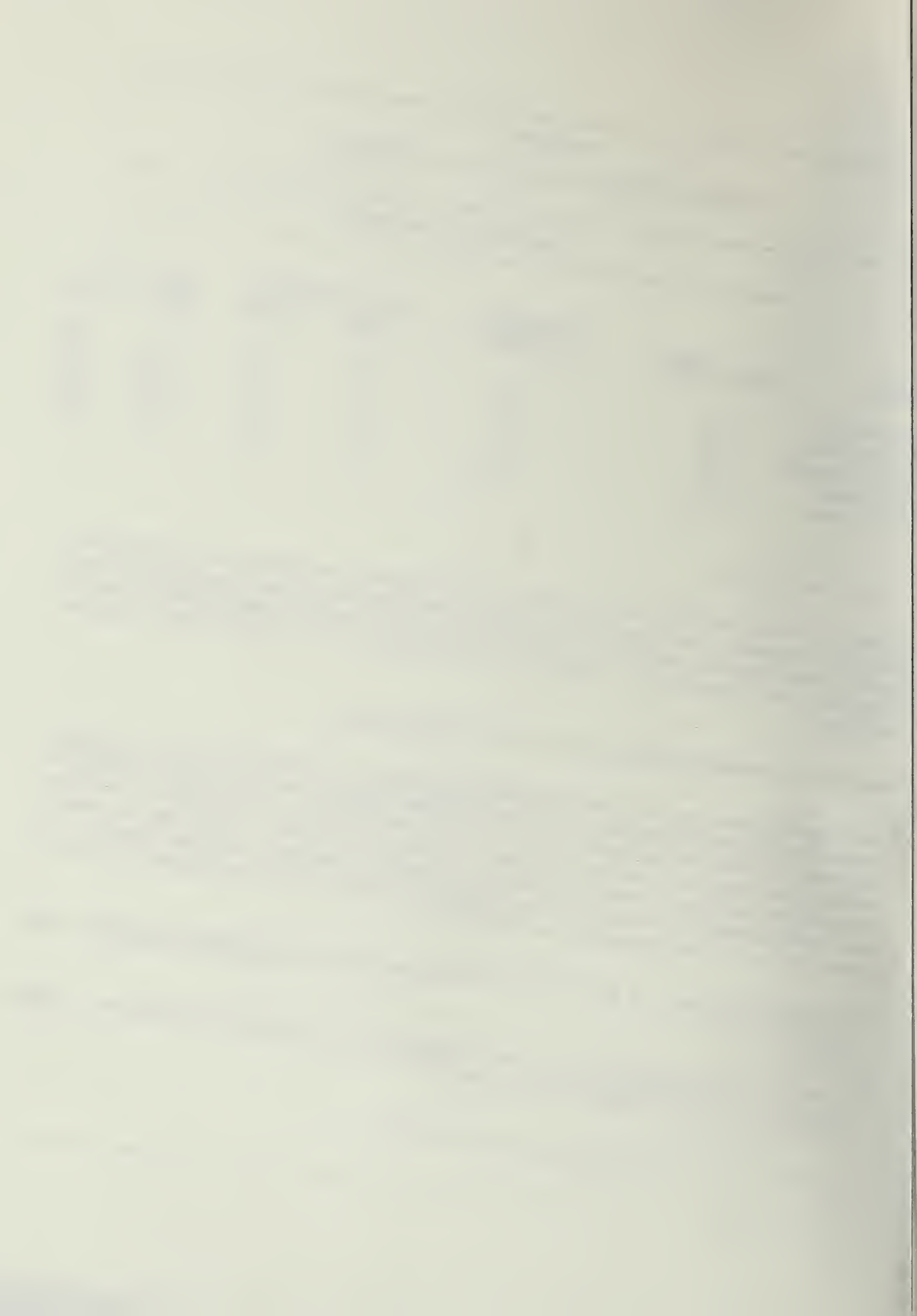
²Based upon a weighted daily average of 4,000 miles traveled.

³Incremental emissions of downtown-area development are based on list of projected Cumulative Office Development in Downtown San Francisco as of March 22, 1985, (see Appendix B, Table B-2 pp. A-8 - A-11). By the year 2000 a larger portion of the motor vehicle pool will meet federal and state emission standards. Therefore, air quality impacts were analyzed under the list-based method for the year 1990, as opposed to the year 2000, in order to provide the most conservative assessment even though the impacts would not be fully realized until the mid-1990s.

⁴Incremental emissions of C-3 District development, per the Downtown Plan EIR, Table IV.I.2, p. IV.I.12.

⁵Cumulative total emissions of Bay Area development, per ABAG, BAAQMD, MTC, 1982 Bay Area Air Quality Plan, pp. 42, 53, and 112.

SOURCE: EIP Associates and Downtown Plan EIR



development in San Francisco would exceed future HC emissions, this development would not lead to an increase in total Bay Area ozone concentrations. This relationship between NOx and HC emissions would hold both under the cumulative list scenario and the Downtown Plan scenario shown.

At the same time, total emissions of both NOx and HC are expected to decrease in San Francisco. Total NOx emissions would decrease in San Francisco by about two percent from 1984 to 2000, but would increase in the Bay Area by about five percent from 1984 to 2000. It is possible that excess NOx emissions generated by cumulative development (including the project) could increase ozone and/or nitrogenous oxidant concentrations further downwind, outside the Bay Area. In addition, NOx emissions generated by cumulative development (including the project) throughout the Bay Area could increase acid rain further downwind, outside the Bay Area, though to a relatively small extent due to the magnitude of the increase and to dilution over time and distance.

In 1990 and 2000 (according to the Downtown Plan EIR), area-wide traffic volumes in the downtown area would increase by about 8% and 15%, respectively, over 1984 volumes; average traffic speeds would decrease by about one mph and two mph, respectively, from 1984 speeds. However, in 1990 and 2000 the average vehicle is expected to emit 32% and 43% less carbon monoxide (CO) respectively, than in 1984 due to ongoing state and federal emissions controls.

CO concentrations at 11 representative intersections in the downtown study area, as analyzed in the Downtown Plan EIR, would decrease from 1984 to 1990 and, thereafter, to 2000. CO concentrations at 10 of the 11 intersections would be within the state and federal standards in 1990 and 2000 under the Downtown Plan and the Alternatives. CO concentrations at one intersection (Brannan and Sixth Streets) would continue to exceed the state and federal eight-hour standards both in 1990 and 2000 under the Downtown Plan and the Alternatives. This suggests that additional intersections not selected for analysis in the Downtown Plan EIR might also exceed air quality standards.

The California State Legislature has mandated a biennial Inspection and Maintenance (I/M) program which applies to most cars and light trucks in California. This program went into operation in March 1984. Vehicles covered by the legislation must undergo a check consisting of a visual inspection of the vehicle's emission control system, measure-

ment of tailpipe emissions while the vehicle is idling and comparison of the measured emissions rates to the allowable limits for the appropriate year of manufacture and model of vehicle. Vehicles must have the required emission control equipment and must meet the specified standards for hydrocarbons and carbon monoxide. If required emissions control equipment is not present it must be installed. If all required equipment is in place but the vehicle's emissions exceed the standards, the owner is required to pay a maximum of \$50 for service intended to result in compliance.

An annual I/M program was evaluated in the 1982 Bay Area Air Quality Plan based on the 1979 source inventory. Based on predicted reduction in hydrocarbons and CO of 25% in covered vehicles, a reduction in total motor-vehicle generated CO of about 18% would be expected. The reduction in total regional CO emissions would be about 16%. The reduction in motor-vehicle generated hydrocarbons would be about 17%; the reduction in total regional hydrocarbon emissions would be about 6%. To account for these reductions, revised emissions factors have been used in the revised Modified Linear Rollback (MLR) model for this project.

Curbside CO concentrations at selected intersections that would be affected by project-generated traffic and by cumulative development traffic (based both on the March 22, 1985 cumulative list and on the Downtown Plan EIR growth projections) were projected for worst-case conditions, and are compared with ambient standards in Table 2, page 7. Although the emission factors differ from those used in the Downtown Plan EIR analysis in that these revised emission factors take the I/M program into account, these projections were calculated using a revised version of the MLR method which was developed for the Downtown Plan EIR.

The results indicate that the state and federal eight-hour CO standards would not be violated under 1990 or 2000 conditions under either the cumulative list or Downtown Plan scenarios at all three intersections studied. By not quantifying predicted reductions from the I/M program, CO emissions were overpredicted for the Downtown Plan EIR.

Emissions of total suspended particulates (TSP) resulting from construction and from vehicle trips generated by the project and cumulative development would increase TSP concentrations, which could increase the frequency of TSP standard violations in San Francisco, with concomitant health effects and reduced visibility.²

TABLE 2
EXISTING AND PROJECTED CURBSIDE CARBON MONOXIDE
CONCENTRATIONS AT SELECTED INTERSECTIONS

Intersection	Averaging Time	Concentrations (ppm) ¹			
		1984	Cumulative List 1990 ²	Downtown Plan ³	
6th/Brannan	1-hour	18.1	11.2	11.2	9.8
	8-hour	<u>13.4</u>	8.0	8.0	7.1
5th/Bryant ⁴	1-hour	16.2	10.4	10.4	9.3
	8-hour	<u>12.5</u>	8.0	7.9	7.0
8th/Bryant ⁴	1-hour	17.0	10.8	10.8	9.5
	8-hour	<u>13.4</u>	8.5	8.5	7.4

¹ Calculations for all scenarios were made using a revised version of the Modified Linear Rollback (MLR) method described in the Downtown Plan EIR. Background concentrations were calculated to be 7.4 ppm for one hour and 5.7 ppm for eight hours in 1984, 6.0 ppm for one hour and 4.5 ppm for eight hours in 1990, and 5.7 ppm for one hour and 4.1 ppm for eight hours in 2000. Underlined values are in excess of the state or federal CO standards. The one-hour state standard is 20 ppm, the one-hour federal standard is 35 ppm, and the eight-hour state and federal standards are 9 ppm. Emission rates were derived from the California Air Resources Board's EMFAC 6D computer model, as published in the BAAQMD's Guidelines, November 1985. These emissions take into account the reduction in CO as a result of the ongoing Statewide Inspection/Maintenance Program.

² Based on the list of projected Cumulative Office Development in Downtown San Francisco as of March 22, 1985 (see Appendix B, Table B-2, p. A-36). By the year 2000 a larger portion of the motor vehicle pool will meet federal and state emission standards. Therefore, air quality impacts were analyzed under the list-based method for the year 1990, as opposed to the year 2000, in order to provide the most conservative assessment even though the impacts would not be fully realized until the mid-1990s.

³ Based on the growth forecast methodology contained in the Downtown Plan EIR.

⁴ Includes effect of adjacent elevated freeway.

SOURCE: EIP Associates and Downtown Plan EIR

Emissions of sulfur oxides (SOx) generated by the project and by cumulative development would not bring San Francisco's sulfur dioxide (SO₂) concentrations measurably closer to violating the standard.

The 1982 Bay Area Air Quality Plan contains strategies which consist primarily of HC and CO emission controls on stationary sources and motor vehicles, and transportation improvements, and are aimed at attaining the federal ozone and CO standards. As discussed above, emissions associated with the project and with cumulative downtown development from the cumulative list or under the Downtown Plan are not projected by this EIR or the Downtown Plan EIR to increase ozone concentrations, and thus would not conflict with the objectives of the 1982 Bay Area Air Quality Plan regarding ozone. Cumulative downtown development had been projected by the Downtown Plan EIR potentially to result in a violation of the eight-hour CO standard at the Brannan/Sixth intersection analyzed therein. By using revised emission factors which account for the I/M program in the revised version of MLR contained in the Downtown Plan EIR, the City no longer predicts violations of CO standards at the Sixth and Brannan intersection or other intersections which have been modeled in the greater downtown. Based on the above, cumulative greater downtown development would not conflict with objectives of the 1982 Bay Area Air Quality Plan regarding CO.

The pollutant emissions and CO concentrations shown in Tables 1 and 2 were projected for 1990 on the basis of two different sets of future growth assumptions, with differing results. In one case, a list of specific projects proposed, approved, and under construction was used (see Appendix B, Table B-2, pp. A-8 through A-11). In the other case the employment growth trend approach of the Downtown Plan EIR was used, and those projections presented. In both cases, the method for air quality analysis was identical. However, the results using projected cumulative development are not directly comparable with those from the Downtown Plan EIR for several reasons.

First, it is reasonable to assume that the projected cumulative development on the list would be completed and the space it provides absorbed sometime between 1990 and 2000, (probably in the mid-1990s), rather than in either of those two analysis years which were used in the Downtown Plan EIR. The pollutant emissions and CO concentrations were calculated for 1990 using the cumulative list, even though those projects are not expected to be completed until the mid-1990s, in order to provide a comparison with the Downtown

Plan EIR results. However, this has the effect of artificially increasing the cumulative list results, because average-vehicle emission rates will decline with time, as a result of state and federal controls.

Second, the transportation analysis used for the Downtown Plan EIR differs from that used for the cumulative list, as described in the Transportation section of this report. Briefly, these differences include the fact that a cumulative list-based analysis assumes the same proportion of new employees would commute by private auto as is currently the case. In contrast, the Downtown Plan EIR analysis projects a shift of commuters from driving alone to carpool and transit, because commute routes such as the Bay Bridge are already at or near capacity and could not accommodate all of the vehicles that would be used if the proportion of persons driving alone to work remained constant.

Other reasons for the differences include the use in the cumulative list analysis of a constant regional distribution of trips, whereas the Downtown Plan EIR forecasts a declining percentage of new employees residing in San Francisco, and the lack in the cumulative list approach of discounting factors to account for trips between individual projects within the Downtown. Also the cumulative list applies to the entire downtown area, a larger geographical area than that analyzed in the Downtown Plan EIR, which contains specific forecasts for the C-3 District but also includes consideration of cumulative impacts of development outside the C-3 District.

Thus, total (regional) vehicle miles traveled and the resulting pollutant emissions projected using the cumulative list approach are considered artificially high. On a local intersection basis, traffic volumes and the resulting CO concentrations might or might not be higher with the cumulative list approach, depending on the particular location. This is because the cumulative list method does not distribute traffic on all the same streets in the same proportions as does the Downtown Plan EIR method.

¹Impacts anticipated from cumulative downtown development have been analyzed in the Downtown Plan Environmental Impact Report (EIR), (EE81.3, certified October 18, 1984). The air quality setting, impacts and alternatives discussion in the Downtown Plan EIR (Vol. 1, pp. IV.I.1-19 and VII.I.1-8; Vol. 2, pp. O.1-9; Vol. 3, part 1, pp. C&R-I, 1-11) is summarized in the text of this EIR and incorporated by reference herein.

²State particulate standards were adopted in 1983 to concentrate on fine particulate matter which has been demonstrated to have health implications when inhaled. Until the State adopts a method for monitoring fine particulate matter, it is not possible to determine what proportion of TSP in San Francisco would be subject to review against the new standards, whether new standards would be violated, or what the health implications would be.

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